

explosive storage magazines, four magazettes, a packaging/receiving building exclusive for explosives, a building for storing nonexplosive packaging incidentals, and two transportainer storage units (SNL/CA 2002b).

A Corporate Explosives Safety Program is used to manage explosives at SNL/CA. It provides guidance for evaluating and safely conducting explosives operations. The Sandia Explosives Safety Committee provides continual review, interpretation, and necessary revision to the Corporate Explosives Safety Program. As part of the explosive material management strategy, SNL/CA uses an Explosives Inventory System to track and manage explosive inventories. The Explosives Inventory System database maintains information on material composition, characteristics, and shipping requirements; life cycle cost information; plan of use; security and hazard classifications; and compatibility codes. When an explosive material is entered into the Explosives Inventory System database upon delivery or receipt, the system performs a safety check to ensure that the intended storage location can accept the type and quantity of material received. The Explosives Inventory System database will flag any storage capacity overages and incompatible explosive items.

4.13.3.1 Occupational Health and Safety

A worker protection program is in place at SNL/CA to protect the health of all workers. To prevent occupational illnesses and injuries and to preserve the health of all workers involved in site-related activities (construction and operations), DOE-approved health and safety programs have been implemented. Table 4-17 presents SNL (lab-wide) injury rates over a 3-year period from 1999 through 2001 (SNL 2001i, 2002a), in terms of total reportable cases (TRC) rate, lost work day cases (LWC) rate, and lost work days (LWD) rate. The TRC value includes work-related death, illness, or injury that resulted in loss of consciousness, restriction from work or motion, transfer to another job, or required medical treatment beyond first aid. The data for LWDs represent the number of workdays beyond the day of injury or onset of illness that the employee was away from work or limited to restricted work activity because of an occupational injury or illness.

As shown in Table 4-17, these health and safety programs have resulted in lower incidences of injury and illness than those that occur in the general industry, construction, and manufacturing workforces.

Table 4-17. Sandia National Laboratories, California Injury and Illness Data (1999 through 2001) Based on 200,000 Work Hours (100 workers)^a

| Calendar Year | Total Reportable Cases Rate | Lost Work Day Cases Rate | Lost Work Days Rate |
|-------------------|-----------------------------|--------------------------|------------------------|
| 1999 | 5.1 (6.3) ^a | 1.2 (3.1) ^a | 0.8 (1.9) ^a |
| 2000 | 4.2 (6.5) ^a | 0.6 (3.3) ^a | 0.3 (2.0) ^a |
| 2001 ^b | 2.9 | 1.1 | 0.1 |
| 3-Year Average | 4.1 (6.5) ^c | 1.0 (3.2) ^c | 0.4 (2.0) ^c |

Source: SNL 2001b, 2002a

^aState of California Injury and Illness data is for all industries including State and local government.

^bState of California Injury and Illness data is for 2001 were not available at the time of the Draft SWEA.

^cThree year average for State of California data covers 1998-2000 timeframe.

4.14 SOCIOECONOMICS

4.14.1 DEFINITION OF RESOURCE

This section describes the demographic and economic variables associated with community growth and development that have the potential to be directly or indirectly affected by changes in operations at SNL/CA. SNL/CA and the communities that support it can be described as a dynamic socioeconomic system. The communities provide the people, goods, and services required by SNL/CA operations. SNL/CA operations, in turn, create the demand and pay for the people, goods, and services in the form of wages, salaries, and benefits for jobs and dollar expenditures for goods and services. The measure of the communities' abilities to support the demands of SNL/CA depends on their ability to respond to changing environmental, social, economic, and demographic conditions.

For a discussion of the DOE operations at SNL/CA, see Section 2.1.

4.14.2 REGION OF INFLUENCE

The socioeconomic ROI is defined by the areas where SNL/CA employees and their families reside, spend their income, and use their benefits, thereby affecting the economic conditions of the region. The ROI consists of a three-county area (Alameda [which includes the city of Livermore], San Joaquin, and Contra Costa counties), where approximately 89 percent of SNL/CA employees reside (not including 274 contract employees) (Figure 4-18). The ROI was chosen for the following reasons (SNL/CA 2002b):

- The majority of SNL/CA employees live within Alameda, Contra Costa, and San Joaquin Counties. The combined population of these three counties



Source: Original

Figure 4-18. Most Sandia National Laboratories, California Employees Live in a Three-County Area near the Site

totals nearly three million. The SNL/CA population of just over 1,000 is a very small fraction of this total.

- The combined value of SNL/CA's payroll and purchases was \$131 M during the year 2000. In comparison, the payroll for all persons employed in Alameda County, alone, was over \$29 billion. Also, had the 50-mi ROI been chosen, instead, it would have included (all or portions of) Contra Costa, Santa Clara, San Francisco, San Mateo, Yolo, San Joaquin, Solano, Sacramento, Merced, and Marin Counties.

4.14.3 AFFECTED ENVIRONMENT

4.14.3.1 Demographic Characteristics

The estimated population in the three-county ROI in 2000 was 2,956,155 people, of whom approximately 49 percent (1,443,741) resided in Alameda County. According to the U.S. Census Bureau, the ROI population grew from 2,563,542 in 1990 to 2,956,155 in 2000, which is an increase of 392,613 people or 15.3 percent over the

1990 count (SNL/CA 2002b, Census 2000a) (Table 4-18). Table 4-19 shows population projections to 2010. Alameda County has attracted the highest population growth. However, San Joaquin and Contra Costa Counties have increased at faster rates than Alameda County (Table 4-18). According to population projections calculated by the California State Department of Finance, San Joaquin County is expected to grow the fastest, 2.9 percent, between 2000 and 2010. Alameda County is expected to grow 1.6 percent and Contra Costa is expected to increase at the rate of 1.3 percent (CADF 2001a). The area, including the town of Danville, the cities of Dublin, Livermore, Pleasanton, and San Ramon, and the surrounding parts of Alameda and Contra Costa counties, is one of the fastest growing subregions of the San Francisco Bay Area. It has evolved from a primarily agricultural area in the 1950s, to an area of single-family residential suburbs in the 1960s and 1970s, to a major employment center in the 1980s. The area is expected to grow by another 77 percent in housing units and 83 percent in the number of jobs between 1990 and 2010 (ABAG 1998a).

Table 4-18. Demographic Profile of the Population in the Three-County Region of Influence

| Population Parameters | Alameda | San Joaquin | Contra Costa | ROI | State of California |
|---|-----------|-------------|--------------|-----------|---------------------|
| 1990 Population | 1,279,182 | 480,628 | 803,732 | 2,563,542 | 29,760,021 |
| 2000 Population | 1,443,741 | 563,598 | 948,816 | 2,956,155 | 33,871,648 |
| Population Change from 1990 to 2000 | 164,559 | 82,970 | 145,084 | 392,613 | 4,111,627 |
| Average Annual Percent Change (1990-2000) | 1.3 | 1.7 | 1.8 | 1.5 | 1.4 |

Source: SNL/CA 2002b; Census 2002a.

ROI: region of influence

Table 4-19. Population Estimates and Projections to 2010

| Population Parameters | Alameda | San Joaquin | Contra Costa | ROI | State of California |
|-----------------------|-----------|-------------|--------------|-----------|---------------------|
| 1990 Population | 1,279,182 | 480,628 | 803,732 | 2,563,542 | 29,760,021 |
| 2000 Population | 1,443,741 | 563,598 | 948,816 | 2,956,155 | 33,871,648 |
| 2005 Population | 1,580,200 | 645,600 | 1,021,400 | 3,247,200 | 37,473,500 |
| 2010 Population | 1,671,200 | 727,800 | 1,071,400 | 3,470,400 | 40,262,400 |

Sources: SNL/CA 2002b; CADF 2001a.

ROI: region of influence

4.14.3.2 Economic Base

The San Francisco-Oakland-San Jose, California Consolidated Metropolitan Statistical Area (CMSA), which includes, among others, Alameda and Contra Costa Counties, is the fifth largest metropolitan area in the U.S. The area contains six Primary Metropolitan Statistical Areas (PMSA), as defined by the U.S. Census Bureau. Three of the six are the San Francisco PMSA, the San Jose/Silicon Valley PMSA, and the Oakland PMSA (Census 2000a). The Oakland PMSA comprises Alameda and Contra Costa Counties. The CMSA is the corporate home for 24 of the nation's Fortune 500 companies. The area is renowned as the worldwide center of high technology, and has been acclaimed as the incubator of biotechnology.

It is also a major multimedia and telecommunications center. SNL/CA is not considered a major employer in the CMSA or in Alameda County (CAMIS 2000a).

Table 4-17 lists employment and income in the ROI. The total number of employed civilian workers in the ROI in 2001 was 1,455,700 (CAMIS 2002a). In 2001, San Joaquin County had the highest unemployment rate (8.7 percent), followed by Alameda and Contra Costa Counties with unemployment rates of 4.5 and 3.3 percent, respectively. The ROI, as a whole, had an unemployment rate of 4.8 percent (Table 4-20) (CAMIS 2002a). Because SNL/CA socioeconomic variables are very small when compared with the surrounding region, employment changes at SNL/CA would not have a

Table 4-20. Employment and Income Profile in the Three-County Region of Influence.

| Labor Parameters | Alameda | San Joaquin | Contra Costa | ROI |
|--|--------------|--------------|--------------|---------------|
| 2001 Annual Average Labor Force Data | | | | |
| Number of Workers | 754,900 | 264,700 | 509,800 | 1,529,400 |
| Employed | 721,000 | 241,600 | 493,100 | 1,455,700 |
| Percent Unemployed | 4.5 | 8.7 | 3.3 | 4.8 |
| Sandia National Laboratories, California Workforce (April 2002) | | | | |
| Number of Workers | 637 | 183 | 108 | 928 |
| Percent of 2000 Population | .04 | .03 | .01 | .03 |
| Personal Income (2000) | | | | |
| Total Personal Income (\$1000) | \$55,972,377 | \$13,208,972 | \$39,194,448 | \$108,375,797 |
| Per Capita (\$) | \$38,624 | \$23,242 | \$41,110 | \$36,479 |

Sources: CAMIS 2002a; BEA 2000b

ROI: region of influence

marked socioeconomic effect on county population or the civilian labor force.

The patterns of employment and income are different among the counties. During 2000 and 2001, employment and per capita income were highest in Contra Costa County, followed by Alameda and San Joaquin Counties (Table 4-20). In 2000, service industries comprised the largest employment sector in Alameda County (312,288 employees or 34.6 percent of total employment). Retail trade accounted for another 14.2 percent, followed by government (13.8 percent) and manufacturing (11.4 percent) (BEA 2000a). Services was the largest employment sector in San Joaquin County in 2000, with 26.2 percent (67,745 employees), followed by the retail trade and government sectors accounting for 16.1 percent and 13.9 percent, respectively (BEA 2000a). The services sector provided the most employment in Contra Costa County (173,520 employees or 36.6 percent), followed by retail trade (16.4 percent), and the finance/ insurance/ real estate sector (12.3 percent) (BEA 2000a).

The total operating and capital budget for SNL/CA for FY 2000 was approximately \$131.3 M (\$57 M for goods and services and \$74.3 M for wages) (SNL/CA 2002b). By comparison, local purchases and payroll expenditures at SNL/CA were \$64 M and \$74.6 M, respectively in 1999 and \$79 M and \$63.4 M, respectively in 1998 (SNL/CA 2002b).

SNL/CA jobs generate indirect and induced jobs in the region. The U.S. Department of Commerce Economics and Statistics Division Bureau of Economic Analysis (BEA) provides multipliers for industrial jobs, income, and earnings (BEA 2002a, b). The BEA uses the RIMS II economic model, which incorporates buying and selling linkages among regional industries to measure the impact of SNL/CA's expenditure of money in the ROI. The model produces three multipliers, two of which are particularly useful. The first multiplier is used to calculate worker earnings, and the second calculates employment. These multipliers provide information needed to estimate SNL/CA's economic impact. Earnings and employment multipliers make possible the identification of not only the direct impacts of an activity on regional income and jobs but also the indirect (business) and induced (household) effects. SNL/CA operations in the ROI have an influence on the economy. The total funding for SNL was approximately \$131.3 M in FY 2000. SNL/CA site workers living in the ROI received approximately \$74.3 M in total wages and salaries in FY 2000. The regional earnings multiplier of 1.64 yields an economic impact of an additional \$121.9 M. For every job at SNL/CA, an estimated additional 0.96 jobs were created in the ROI, which means that the 1,317 average employment level in FY 2002 resulted in an additional 1,264 jobs. In effect, nearly one

Measuring Sandia National Laboratories, California's Economic Impact on the Region of Influence

A multiplier is a factor used to calculate the incremental effect of changes, in dollars spent or jobs created or lost, at SNL/CA. For example, the earnings multiplier is used to calculate the total income generated in the ROI for each \$1 of income paid to workers at SNL/CA. The employment multiplier is used to calculate the total number of generated jobs in the ROI for each job created at SNL/CA. This SWEA identified the following multipliers:

Earnings Multiplier—\$1 income from SNL/CA for workers generates another (\$0.64), for a total impact on income of (\$1.64) in the ROI.

Employment Multiplier—100 jobs created at SNL/CA generates another 96 jobs, for a total impact of 196 jobs in the ROI.

Source: BEA 2002a, b

out of every 564 jobs (or 2,581 out of 1,455,700) in the ROI was created or supported by SNL/CA.

4.14.1.3 Housing and Community Services

Housing

Table 4-18 lists the total number of occupied housing units and vacancy rates in the ROI. In 2000, the ROI contained 1,083,920 housing units, of which 1,049,124 were occupied. The vacancy rate was lowest in Contra Costa County (2.9 percent) and highest in San Joaquin County (4.0 percent). Vacant units in the ROI numbered 34,796, creating an overall vacancy rate of 3.2 percent.

Public Education

In 2001-2002, student enrollment totaled 506,687 in the ROI (Table 4-21) (CADE 2002a). The local school district is the Livermore Valley Joint Unified School District and includes schools from kindergarten through high school. The local school district serves over 10,000 students from a 240-sq mi area that includes the City of Livermore. There is no available information on the number of children of SNL/CA employees that attend district schools. However, the number is estimated to be less than 2 percent (under 200 students) of the total district's total enrollment (SNL/CA 2002b).

Health Care

SNL/CA has an onsite medical facility designed to handle most onsite emergencies and routine physical examinations for safety considerations (such as exams for users

Table 4-21. Housing and Education in the Region of Influence

| Parameters | Alameda | San Joaquin | Contra Costa | ROI |
|--------------------------------|---------|-------------|--------------|-----------|
| Housing (2000) | | | | |
| Total Units | 540,183 | 189,160 | 354,577 | 1,083,920 |
| Occupied Housing Units | 523,366 | 181,629 | 344,129 | 1,049,124 |
| Vacant Units | 16,817 | 7,531 | 10,448 | 34,796 |
| Vacancy Rate | 3.1 | 4.0 | 2.9 | 3.2 |
| Public Education (2002) | | | | |
| Total School Enrollment | 217,591 | 127,354 | 161,742 | 506,687 |

Source: Census 2000b; CAMIS 2002a

ROI: region of influence

of respirators). In the case of life-threatening injuries, SNL/CA has an arrangement with Valley Memorial Hospital in Pleasanton for emergency services (SNL/CA 2002b).

Fire Protection Services

SNL/CA does not maintain an onsite fire department. Through a memorandum of understanding, the LLNL Fire Station No. 1 will provide the primary emergency response to SNL/CA. The LLNL fire department responds to all alarms at SNL/CA and will respond to calls from SNL/CA's Central Alarm Station (which is manned 24 hours a day, 365 days a year). SNL/CA's fire protection personnel estimate that the LLNL fire department responds to calls at SNL/CA an average of 50 times per year (SNL/CA 2002b).

Police and Security Services

SNL/CA has a security force that is responsible for onsite security. Actions within the purview of the security force include badging and visitor clearances, securing the site and adjacent areas, responding to security threats, supporting building emergency team activities, and assisting in site evacuation. The security force's Security Supervisor is the primary liaison between the LLNL security force, the Alameda County Sheriff's Department, and the Livermore Police Department. The need for police services from the City of Livermore is infrequent, about once per year (SNL/CA 2002b).

4.15 ENVIRONMENTAL JUSTICE

4.15.1 DEFINITION OF THE RESOURCE

Environmental justice has been defined as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (EPA 2002). Concern that minority and/or low-income populations might be bearing a disproportionate share of adverse health and environmental impacts led President

Clinton to issue an Executive Order (EO) in 1994 to address these issues. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs Federal agencies to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. When conducting NEPA evaluations, the DOE incorporates environmental justice considerations into both its technical analyses and its public involvement program in accordance with the EPA and CEQ (CEQ 1997).

4.15.2 REGION OF INFLUENCE

The DOE selected the area within a 15-mi radius of the SNL/CA site as the ROI, an area that encompasses the City of Livermore and portions of three counties (Alameda, Contra Costa, and San Joaquin). The City of Tracy, which lies mostly outside of the 15-mi radius, was also included because a substantial number of SNL/CA employees live there. This ROI was selected because a majority of SNL/CA employees live within the three-county area; past analyses of potential impacts of releases of toxic gases and radionuclides showed that concentrations would be "negligible" at or beyond the site boundary; and assessments of the consequences of the worst credible accident at the SNL/CA site suggest that a 15-mi ROI is the appropriate area of analysis for environmental justice impact analysis (SNL/CA 2002b).

4.15.3 IDENTIFYING MINORITY AND LOW-INCOME POPULATIONS

Demographic information from the U.S. Census Bureau website was used to identify minority and low-income populations in the ROI. Information on locations and numbers of minority populations was obtained from the 2000 U.S. Census, while information on low-income populations was developed from the 1997 Economic Census (SNL/CA 2002b).